IN THE CLAIMS

Claims 1-65 (canceled)

66. (new) A process comprising:

applying a mixture comprising a resin and inorganic particles to a metallic substrate and drying to form a polymeric, corrosion-resistant, electrically conductive and electrically weldable dried coating;

wherein said inorganic particles comprise electrically conductive particles;

wherein the mixture comprises at least 10 wt.% of the electrically conductive particles having an electrical conductivity better than that of particles of pure zinc and having a Mohs hardness of greater than 4, based on a total solids contents of the mixture; and

wherein the electrically conductive particles have a particle size distribution;

wherein the transfer value d_{99} relative to the transfer value d_{10} in a volume plot has a factor of at most 10;

wherein 3 to 22 vol.% of the electrically conductive particles, in a measured volume plot are larger than the average layer thickness of the dried coating, determined on scanning electron microscopy photograph;

wherein the coating has a thickness of less than 10 μm;

wherein at least a portion of the electrically conductive particles project out of the polymeric coating; and

wherein at least a portion of the electriealIy conductive particles have a Mohs hardness of at least 5.5.

67. (new) A process comprising:

applying a mixture comprising a resin and inorganic particles to a metallic substrate and drying to form a polymeric, corrosion-resistant, electrically conductive and electrically weldable dried coating;

wherein said inorganic particles comprise electrically conductive particles;

wherein at least 10 wt.% electrically conductive particles having an electrical conductivity better than that of particles of pure zinc and having a Mohs hardness of greater than 4, based on a solids contents of the mixture; and

wherein an envelope curve of a particle size distribution for the electrically conductive particles, in a measured logarithmic volume plot is at least twin-peaked and is divided into individual Gauss distribution curves;

wherein a first minimum of the individual Gauss distribution curves between a main peak and a next larger peak of these distribution curves, determined in µm, is greater by a factor of 0.9 to 1.8 than the average dry film thickness of the coating, determined on scanning electron microscopy photographs;

wherein not more than 22 vol.% of the particle size distribution of the electrically conductive particles is larger than the average dry film thickness;

wherein the coating has a thickness of less than 10 µm;

wherein at least a portion of the electrically conductive particles project out of the polymeric coating; and

wherein at least a portion of the electrically conductive particles have a Mohs hardness of at least 5.5.

68. (new) The process according to claim 66, wherein the particle size distribution of inorganic particles other than the electrically conductive particles, when measured, has a greater volume content of the largest particles at the particle volume transfer value d_{98} or in a Gauss distribution curve with the largest particle volumes than at the particle volume transfer value d_{98} or in a corresponding Gauss distribution curve of the electrically conductive particles.

69. (new) The process according to claim 66, wherein the mixture comprises no electrically conductive particles having a particle size diameter greater than five times the value of an average dry coating thickness of the dried and optionally also cured coating.

70. (new) The process according claim 66, wherein the mixture comprises 20 to 80 wt.% of electrically conductive particles having an electrical conductivity better than that of particles of zinc and having a Mohs hardness of greater than 4, based on the solids contents of the mixture.

71. (new) The process according to claim 66, wherein the mixture comprises particles which slide or are a corrosion protection pigment.

72. (new) The process according to claim 66, wherein the electrically conductive particles are selected from the group consisting of an alloy a boride, a carbide, an oxide, a phosphide, a phosphate, a silicate and a silicide.

73. (new) The process according to claim 66, wherein the mixture additionally comprises a curing agent, a photoinitiator, an additive, water, an organic solvent or 0.5 to 15 wt.% of a corrosion protection pigment.

74. (new) The process according to claim 71, wherein the particles which slide ground with before addition to the mixture.

75. (new) The process according to claim 66, wherein electrically conductive particles are ground and mixed with other batches of electrically conductive particles.

76. (new) The process according to claim 66, wherein a curing agent is added to the mixture.

77. (new) The process according to claim 66, wherein the mixture, is at least one of irradiated with free radicals or heated in order to form a crosslinked, corrosion-resistant, viscoelastic coating.

78. (new) The process according to claim 66, wherein a coating having a thickness of less than 8 μm, preferably less than 6 μm and particularly preferably of less than 4 μm, measured in the dry state on scanning electron microscopy photographs, is produced.

79. (new) The process according to claim 66, wherein the mixture is free or substantially free from organic lubricants, acids or heavy metals.

80. (new) The process according to claim 73, wherein the substrate comprises at least one of a metal or a metal alloy selected from the group consisting of aluminum, iron, magnesium alloy and steel.

81. (new) The process according to claim 73, wherein the metallic substrate is treated with a pretreatment coating.

82. (new) The process according to claim 67, wherein the particle size distribution of inorganic particles without the electrically conductive particles, has a greater volume content of largest particles at a particle volume transfer value d_{98} or in the Gauß distribution curve with the largest particle volumes than at the particle volume transfer value d_{98} or in the corresponding Gauß distribution curve of the electrically conductive particles.

83. (new) The process according to claim 67, wherein the mixture comprises no electrically conductive particles having a particle size diameter greater than five times the value of an average dry coating thickness of the coating.

84. (new) The process according claim 67, wherein the mixture comprises 20 to 80 wt.% of electrically conductive particles having an electrical conductivity better than that of particles of zinc and having a Mohs hardness of greater than 4, based on the solids contents of the mixture.

85. (new) The process according to claim 67, wherein the mixture additionally comprises particles which slide.

86. (new) The process according to claim 67, wherein the electrically conductive particles are selected from the group consisting of an alloy, a boride, a carbide, an oxide, a phosphide, a phosphate, a silicate and a silicide.

87. (new) The process according to claim 67, wherein the mixture further comprises a curing agent, a photoinitiator, an additive, water, an organic solvent or 0.5 to 15 wt.% of corrosion protection pigment.

88. (new) The process according to claim 86, wherein the particles which slide are ground before addition to the mixture.

89. (new) The process according to claim 67, wherein electrically conductive particles are ground and mixed with batches of electrically conductive particles.

90. (new) The process according to claim 67, wherein a curing agent is added to the mixture

91. (new) The process according to claim 67, wherein the mixture at least one of irradiated with free radicals or heated in order to form a crosslinked, corrosion-resistant, viscoelastic coating.

92. (new) The process according to claim 67, wherein a coating having a thickness of less than 8 μm, preferably less than 6 μm and particularly preferably of less than 4 μm, measured in the dry state on scanning electron microscopy photographs, is produced.

93. (new) The process according to claim 67, wherein the mixture is free or substantially free from organic lubricants, acids, or heavy metals.

94. (new) The process according to claim 88, wherein the substrate comprises aluminum, iron, magnesium alloy or steel.

95. (new) The process according to claim 88, wherein the substrate is a pretreatment coating.

96. (new) A coated substrate comprising a corrosion-resistant, electrically conductive and electrically weldable dried coating on a metallic strip or a metallic sheet, wherein the coating comprises a resin and inorganic particles, wherein the inorganic particles comprise electrically conductive particles, wherein the mixture comprises at least 10 wt.% of electrically conductive particles having an electrical conductivity better than that of particles of pure zinc and having a Mohs hardness of greater than 4, based on a solid contents of the mixture, wherein at least a portion of the electrically conductive particles have a Mohs hardness of at least 5.5, wherein the coating has an average dry film thickness of less than 10 microns, wherein electrically conductive particle project from the coating and, wherein the transfer value d_{99} relative to the transfer value d_{10} in a volume plot has a factor of at most 10.

97. (new) A coated substrate comprising a substrate that is a metallic strip or a metallic sheet and a corrosion-resistant, electrically conductive and electrically weldable dried coating, wherein said coating comprises a resin and inorganic particles and has an average dry film thickness of at least 4 μm and less than 10 μm, wherein the inorganic particles comprise electrically conductive particles, wherein a mixture comprising at least 10 wt.% of electrically conductive particles is applied to the substrate and dried to form the coated substrate, wherein the electrically conductive particles have an electrical conductivity better than that of particles of pure zinc and having a Mohs hardness of greater than 4, based on the solids contents of the mixture, wherein at least a portion of the electrically conductive particles have a Mohs hardness of at least 5.5, and wherein by resistance spot welding of at least 1,000 welding points can be set through two of the coated substrates under welding conditions in the automobile industry, without replacement or reworking of welding electrodes and without smoke traces wherein electrically conductive particle project from the coating and, wherein the transfer value d_{99} relative to the transfer value d_{10} in a volume plot has a factor of at most 10.

98. (new) A coated substrate comprising a substrate coated with a corrosion-resistant, electrically conductive and electrically weldable dried coating, wherein said coating comprises a resin and inorganic particles and has an average dry film thickness of at least 4 μm and less than 10 μm, wherein the substrate is a strip or a sheet of steel 0.8 mm thick and comprises at least one layer of zinc or of a zinc-containing alloy precoated thereon; wherein the inorganic particles comprise electrically conductive particles, wherein by resistance spot welding at least 1,000 welding points, can be set through two substrates coating in this manner under welding conditions in the automobile industry, without replacement or reworking of welding electrodes and without smoke traces, the coating by applying a mixture which comprises at least

10 wt.% of the electrically conductive particles, wherein the electrically conductive particles have an electrical conductivity better than that of particles of pure zinc and a Mohs hardness of greater than 4, based on the solids contents of the mixture, wherein at least a portion of the electrically conductive particles have a Mohs hardness of at least 5.5, wherein at least a portion of the electrically conductive particles project from the dried coating, and wherein the transfer value d_{99} relative to the transfer value d_{10} in a volume plot has a factor of at most 10.

99. (new) A coated substrate comprising a substrate coated with a corrosion-resistant, electrically conductive and electrically weldable dried coating, wherein the dried coating comprises a resin and inorganic particles and have an average dry film thickness of at least 2 μm and less than 10 μm, wherein the substrate is a strip or a sheet of 0.8 mm thick of steel that is precoated on both sides thereof with at least one layer of zinc or of a zinc-containing alloy, wherein the inorganic particles comprise electrically conductive particles, wherein by resistance spot welding at least 1,800 welding points can be set through two substrates under welding conditions in the automobile industry without replacement or reworking of welding electrodes and without smoke traces, wherein the dried coating is produced by applying a mixture which comprises at least 10 wt.% of the electrically conductive particles to the substrate and drying to form the dried coating, wherein the electrically conductive particles have an electrically conductivity better than that of particles of pure zinc and a Mohs hardness of greater than 4, based on the solids contents of the mixture, and wherein at least a portion of the electrically conductive particles have a Mohs hardness of at least 5.5, wherein electrically conductive particle project from the coating and wherein the transfer value d_{99} relative to the transfer value d_{10} in a volume plot has a factor of at most 10.

100. (new) A polymeric, electrically conductive and electrically weldable coating on a substrate, produced by the process according to claim 66.

101. (new) A composition comprising steel and a coating produced according to the process of claim 66, wherein the coating is subjected to thermal curing at a temperature not above 160 °C.

102. (new) A polymeric, electrically conductive and electrically weldable coating on a substrate produced by the process of claim 67.

103. (new) A composition comprising steel and the coating produced according to the process of claim 67, wherein the applied mixture is cured with thermal curing at a temperature not above 160 °C.

104. (new) The process of claim 66, wherein the coating is crosslinked.

105. (new) The process of claim 67, wherein the coating is crosslinked.

106. (new) A process comprising producing a coated substrate comprising a metallic substrate coated with a dried corrosion-resistant, electrically conductive and electrically weldable coating, on a metallic substrate by:

applying a mixture comprising a resin and inorganic particles to the metallic substrate and drying to form a dried coating,

wherein the inorganic particles comprise electrically conductive particles,

wherein the mixture comprises at least 10 wt.% of the electrically conductive particles have an electrical conductivity better than that of particles of pure zinc and a Mohs hardness of greater than 4, based on a total solids contents of the mixture, and

wherein the electrically conductive particles have a particle size distribution;

wherein a transfer value d_{99} relative to a transfer value d_{10} in a volume plot has a factor of at most 10;

wherein 3 to 22 vol.% of the electrically conductive particles, in a measured volume plot are larger than the average layer thickness of the dried and optionally also cured coating, determined on scanning electron microscopy photograph;

wherein the dried coating has a thickness of less than 10 μm; and

wherein at least some of the electrically conductive particles project out of the polymeric coating.

107. (new) The process of claim 66, wherein the electroconductive particles are alloys of molybdenum, niobium, tantalum, tungsten or tin.

108. The process of claim 67, wherein a substantial portion of the electroconductive particles are alloys of molybdenum, niobium, tantalum, tungsten or tin.